Abstract of the Disclosure

Method and system for converting a first light beam having a first frequency into a second light beam having a second frequency. A pump photon having (angular) frequency 3ω (or 4ω) is provided within an optical cavity, defined by two mirrors that are fully reflecting at a frequency 2ω. In a first approach, the pump photon is received and down-converted ($3\omega \rightarrow 2\omega + \omega$) by a first nonlinear crystal, and the 2ω photon is further down-converted ($2\omega \rightarrow \omega + \omega$) by a second nonlinear crystal), to produce three photons ($\omega + \omega + \omega$) that exit from the cavity. In a second approach, the pump photon is received and down-converted ($4\omega \rightarrow 2\omega + 2\omega$) by a first nonlinear crystal, and one or both of the 2ω photons is further down-converted ($2\omega \rightarrow \omega + \omega$) by a second nonlinear crystal).